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ABSTRACT

This paper presents the results of a research study carried out with Mexican college students to analyze the relationship between readers' cognitive styles (field dependent/independent) and their performance at different levels of written discourse processing in Spanish (L1) and English (L2). The sample for the study included 452 undergraduate volunteers from the Universidad Automa Metropolitana in Mexico City. Results show significant differences in reading comprehension both in L1 and L2 between field dependent and independent students, as well as significant differences in cognitive styles between groups defined by gender, field of study, and academic level. There are three main findings: a highly significant correlation was found between reading Spanish as a first language and reading English as a Second Language, which suggests an extrapolation of reading strategies from L1 to L2; there is a positive and highly significant correlation between the field dependent and field independent cognitive style and reading comprehension in both L1 and L2, lending weight to the idea that cognitive style is an important source of individual variation and very important to reading comprehension; significant differences in cognitive style were found when considering variables such as gender and the field of students, thus emphasizing the importance of taking these factors into consideration when designing curricula and instructional strategies, particularly for teaching reading comprehension. Extensive statistical analysis with numerous charts, tables, and mathematical formulas, and five references are included. (KFT)

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COGNITIVE STYLE AND READING COMPREHENSION IN L1 AND L2

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ABSTRACT. The purpose of this paper is to present the main results of a research study carried out with Mexican college students in order to analyze the relationship between readers' cognitive styles (field-dependent/independent) and their performance at different levels of written discourse processing in Spanish (L1) and in English (L2). The sample for the study included 452 voluntary undergraduate college students from the *Universidad Autónoma Metropolitana* in Mexico City. Results show significant differences in reading comprehension both in L1 and L2 between field dependent and independent students, as well as significant differences in cognitive styles between groups defined by gender, field of study, and academic level.

The interest in the analysis of individual differences in the study of reading comprehension has increased markedly. A particular field of research emphasis has been the analysis of the relationship between cognitive style and academic achievement in general, and reading performance in particular. According to Witkin *et. al.* (in Firth and Fitzgerald, 1985), "a great deal of evidence has accumulated from research using the construct to show that a cognitive style approach can be useful in understanding how students learn, how teachers teach, how teachers and students interact, and how students make educational-vocational choices" (p.803).

Different categorizations of cognitive style are reported in the literature. This study was centered on the field dependent (FD) - field independent (FI) dimension of cognitive style which represents *"...the extent to which an individual relies primarily on the self or is influenced by the world outside (i.e., the "field") in psychological functioning."* (Witkin et. al.,1977). Following is a brief summary of the main characteristics associated to FD and FI subjects:

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Field Dependent Subjects	Field Independent Subjects
Learn material with social content better than FI subjects	Impose structure on unstructured material
Are more positively influenced by their teachers	Do better without teacher interference
Perform better on structured tasks than unstructured tasks	Learn better with intrinsic motivation
Are distracted by non-salient cues	Depend upon themselves rather than someone else
Are considered to have an interpersonal orientation	Approach problem solving situations analytically
Are thought to be socially oriented and would be apt to converse and communicate	Are independent and attendant to details . Rely on internal frames of reference, as self-reliant types
Might do well in L2 acquisition when acquiring the language by interacting with native speakers	Might be good at language learning activities such as finding patterns, organizing data to make generalizations, and learning rules

Table 5. Differentiation of Field Dependent/Field Independent cognitive Styles (Based on: Jameson, 1992)

METHOD

SUBJECTS

452 voluntary undergraduate Mexican college students, 267 males and 185 females, with a mean age of 24.76 yr., participated in the study. 146 of the students were enrolled in the Division of Basic Sciences and Engineering (32.3%), 233 in the Division of Social Sciences and Humanities (51.5%) , and 73 in the Division of Health Sciences (16.2%). As to their level of studies, the sample included 87 freshmen (19.8%), 142 intermediate (32.3%), and 211 senior students (48.0%).

INSTRUMENTS

Reading Comprehension Tests. The evaluation of reading comprehension strategies in L1 and L2 was based on a revised version of a set of reading comprehension tests validated from a previous study (Vivaldo, López, González Robles, 1994). The tests in English and in Spanish were equivalent regarding text format (expository academic texts with similar conceptual density, extension, and organization), structure (37 multiple choice items each), skills evaluated (schematic, local coherence, macropropositional, and prepositional text processing strategies), and evaluation criteria (scores ranging form 0-33). In all cases, items were written in Spanish in order to prevent additional processing demands. Four alternative test formats were administered, based on a counterbalanced procedure.

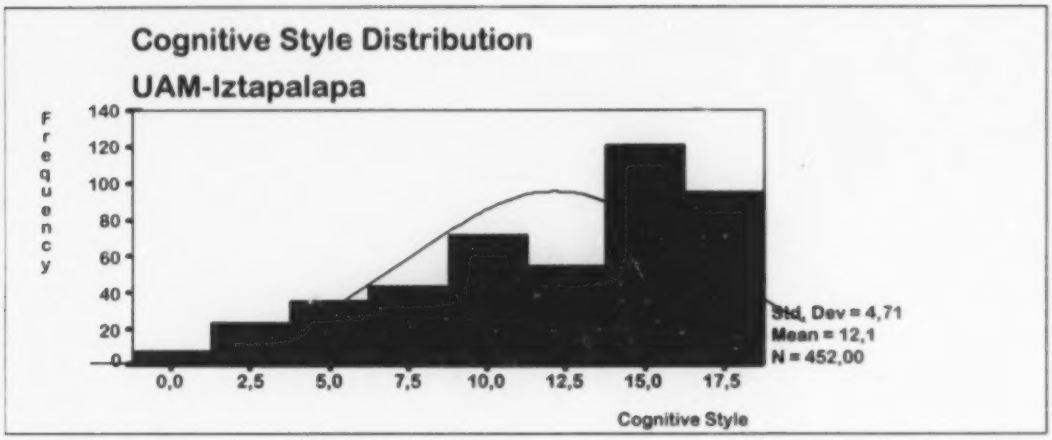
Cognitive Style Test. Field Dependence-Independence was assessed by the Group Embedded Figures Test (Oltman et. al., 1971). The test requires subjects to perceive and outline a series of simple geometric shapes embedded in complex designs, and includes three sections of seven, nine, and nine items, respectively; the number of simple figures correctly identified on the last two sections constitutes the raw score ranging from 1 (strongly field dependent) to 18 (strongly field independent).

PROCEDURE

Subjects were administered the Group Embedded Figures Test according to the specific guidelines established in the corresponding Manual. The administration of the GEFT was followed by the administration of the reading comprehension tests on two consecutive one hour-and-a-half sessions. Data analysis were performed using the Statistical Package for Social Sciences (SPSS).

RESULTS

Mean reading scores for English (16.80/33) and Spanish (20.92/33) were below expected values in a college student population, mainly in regard to the L1 score (corresponding to grades of 50/100 and 63/100, respectively). As for cognitive style, a mean score of 12.3/18 was obtained (corresponding to the upper limit of the central field category), with a sample distribution showing a trend towards field independence (Graph 1).



GRAPH 1. Cognitive Style Distribution

Multiple correlation analyses (Table 1) showed highly significant correlations between reading comprehension scores in L1 and L2 ($r = .4659$, $p < .001$), as well as between cognitive style and reading comprehension in Spanish ($r = .3764$, $p < .001$), and in English ($r = .2725$, $p < .001$).

	RCL1	RCL2	ESTCOG
RCL1	1.0000	.4659**	.3764**
RCL2	.4659**	1.0000	.2725**
COGEST	.3764**	.2725**	1.0000

* - Signif. LE .05 ** - Signif. LE .01 (2-tailed)

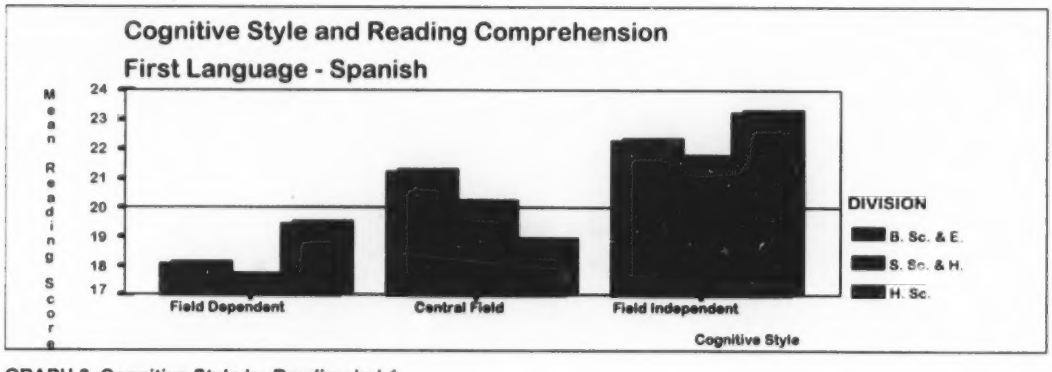
TABLE 1. Multiple Correlation Analysis

In order to analyze the differences in reading comprehension scores in L1 and L2 between groups defined by cognitive style, the sample was divided into FD, CF, and FI groups on the basis of their scores in the GEFT. The results of a series of Analyses of Variance showed highly significant

differences in reading scores among cognitive style groups both in Spanish ($F = 30.87$, $p < .001$) and in English ($F = 30.87$, $p < .001$). Post-hoc analyses (Tukey's Honest Significant Difference) revealed that in the case of reading in L1, the FI mean score was significantly different from the other two groups (CF and FD), whereas the CF group mean score was also significantly different from the FD reading score. As for reading in L2, Tukey's Test revealed that there was a significant difference in mean reading scores between the field independent subjects and the other two cognitive style groups (CF and FD) (Table 3)

Variables in ANOVA	Cognitive style group	Reading Comprehension Mean Score	F Ratio	Significance Level
Cognitive Style by Reading in Spanish - L1	Field Independent	22.1694	30.8737	.0000
	Central Field	20.0942		
	Field Dependent	17.9848		
Cognitive Style by Reading in English - L2	Field Independent	17.7661	15.1694	.0000
	Central Field	16.0290		
	Field Dependent	14.7576		

Table 2. Analyses of Variance (Reading Comprehension in L1 and L2 by Cognitive Style)



GRAPH 2. Cognitive Style by Reading in L1

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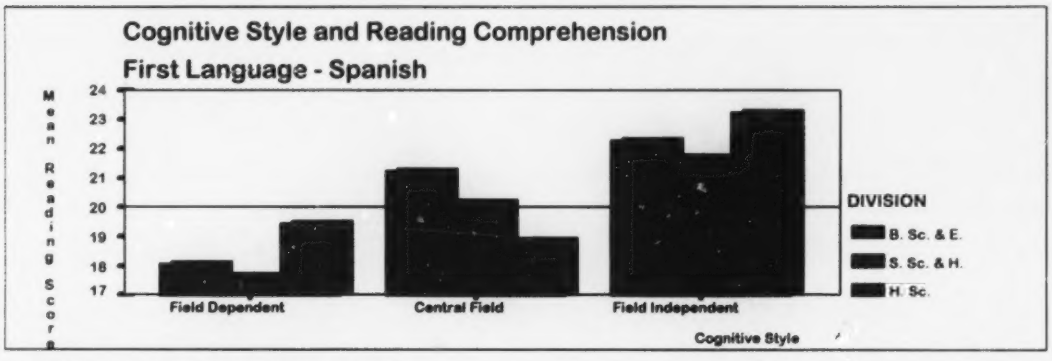

GRAPH 3. Cognitive Style by Reading in L21

Further ANOVA's showed highly significant differences in cognitive styles among groups defined by area of studies (Table 3). Post-hoc analysis with THSD test showed that there were significant differences between the mean cognitive style scores of students in the Basic Sciences and Engineering School and the scores of the students in the other two Schools (Social Sciences and Humanities and Health Sciences). No significant differences were found among groups defined by academic level (freshmen, sophomore, junior, and senior) (Table 3).

Variables in ANOVA	SCHOOL (Field of Study)	Cognitive Style Mean Score	F Ratio	Significance Level
Cognitive Style by Field of Study	Basic Sciences and Engineering	14.0616	20.1264	.0000
	Social Sciences and Humanities	11.0730		
	Health Sciences	11.6438		
Variables in ANOVA	**Academic Level**	**Cognitive Style Mean Score**	**F Ratio**	**Significance Level**
Cognitive Style by Academic Level	Freshman	12.7586	1.6364	.1959
	Sophomore/Junior	11.6901		
	Senior	12.3744		

Table 3. Analyses of Variance (Cognitive Style by Field of Study / Academic Level)

Finally, in order to analyze gender differences in reading performance and cognitive style, a series of T tests was carried out which revealed highly significant differences in mean reading scores in Spanish between males and females ($t=2.90$, $p < .05$) with males obtaining the higher mean reading scores(, as well as highly significant differences in cognitive style scores between gender groups ($t = 5.83$, $p < .001$). No significant differences in reading comprehension scores in English were found between gender groups.

CONCLUSIONS

- An interesting and highly significant correlation was found between reading in Spanish as a first language and reading in English as a foreign language, which suggests the possibility of an extrapolation of reading strategies from L1 to L2.

- There is a positive and highly significant correlation between the field dependent / field independent cognitive style and reading comprehension both in L1 and L2, which supports previous findings reported in the literature. Furthermore, the field independent cognitive style was associated to higher reading scores in both languages at a highly significant level, thus providing construct-related evidence validating a model of reading comprehension that would include cognitive style as a source of individual variation.

- Significant differences in cognitive style were found when considering variables such as gender and field of studies, thus emphasizing the importance of taking into consideration cognitive style variations in the design and implementation of instructional methodologies, particularly in the teaching of reading comprehension strategies with college student populations.

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